

REMARKS

In response to the Office Action mailed March 8, 2007, Applicants respectfully request reconsideration. Claims 1-12 are pending in this application with claims 1-4 being independent. Claim 1 has been amended herein. No new matter has been added.

Rejection under 35 U.S.C. § 112

The Office Action rejected claim 1 under 35 U.S.C. § 112, second paragraph, as being indefinite because General Formula (1) in claim 1 included a carbon next to R¹⁰ that had five bonds attached to it. In response, Applicants have amended claim 1 to correct this error. Accordingly, Applicants respectfully request that this rejection be withdrawn.

Rejections under 35 U.S.C. § 103

The Office Action rejected claims 1-12 under 35 U.S.C. §103(a), as being purportedly unpatentable over Wariishi et al (US6,376,765) in view of Osuka (WO 02/14322). Applicants respectfully traverse these rejections because one of ordinary skill in the art would not have modified Wariishi according to Osuka in the manner suggested by the Office Action.

1. Discussion of Wariishi

Wariishi et al. describes a photoelectric conversion device and a photo-electrochemical cell (Title). Wariishi's device includes an electrolyte composition having imidazolium compounds and pyridinium compounds. (Col. 1, lines 64-67). One example of the electrolyte composition used by Wariishi is a metal complex dye (Col. 27-28). Formula R-16 of Wariishi illustrates the structure of a single porphyrin molecule, and appears to refer to formulas R-15 to R-20 as examples of photosensitive dyes. Wariishi states one purpose of his electrolytes is to achieve a solar cell with excellent photoelectric conversion properties. (Col. 1, lines 58-63, Col. 58 lines 25-33).

2. Discussion of Osuka

Osuka describes the preparation of various fused porphyrin oligomers, from either the Zn(II) porphyrin monomer or from the linked Zn(II) porphyrin oligomer. (Col. 1, lines 12-25

and Col. 2, lines 39-45). Osuka's synthesis of polymeric porphyrin links one porphyrin to another via the β carbon or the pyrrole-like subunits. (Col. 3, line 65- Col. 4, line 12).

According to Osuka, linked porphyrin arrays have been regarded as having a promising use as an optical wire (e.g., a conductive wire). (Col. 1, lines 60-67). Osuka states:

The linear meso-meso linked porphyrin arrays have been regarded to be a promising unit for the usage as optical wire and electric molecular wire in light of rod-like structure, large electronic interactions between the neighboring porphyrin that are sufficient to induce rapid non-coherent excitation energy transfer hopping, and lack of an energy sink that blocks the energy transfer cascade along the array. (Col. 1, lines 60-67).

3. The Combination of Wariishi and Osuka is Improper.

MPEP §2142 requires that there be a reasonable expectation of success when combining references for an obviousness rejection under 35 U.S.C. §103. In the present case, the rejections under 35 U.S.C. §103 are improper because one of ordinary skill in the art would not have had a reasonable expectation that Osuka's linked porphyrin arrays could suitably perform the photoelectric conversion function of a solar cell.

The Office Action contends that one of ordinary skill in the art would have been motivated to modify Wariishi's photoelectric conversion device by using Osuka's linked porphyrin polymer because "it would provide rapid non-coherent excitation energy transfer hopping and lack of an energy sink that blocks the energy transfer." (Page 4). Applicants respectfully disagree. The passage of Osuka relied upon in the Office Action describes the properties of linked porphyrin arrays for use as conductive molecules or wires (Col. 1, lines 60-67). However, Osuka does not suggest that linked porphyrin arrays would have been capable of performing photoelectric conversion, much less that such porphyrin arrays would be suitable for replacing the sensitizing dye of a solar cell. One of ordinary skill in the art would not have been driven to replace Wariishi's sensitizing photoelectric conversion dye with Osuka's polymers because there would be no reasonable expectation of success that Osuka's polymers could have successfully performed the photoelectric conversion of a solar cell. Rather, the suitability of linked porphyrin arrays for performing the photoelectric conversion function of a solar cell would have been unknown, and the solar cell might not have converted light into electrical power as intended.

As discussed above, the stated purpose of Wariishi is to achieve a solar cell with excellent photoelectric conversion properties. (Col. 1, lines 58-63). However, one of ordinary skill in the art would not have known whether such properties would be achievable because Osuka is silent as to the photoelectric conversion properties of linked porphyrin arrays. For these reasons, the combination of Wariishi and Osuka is improper. Accordingly, Applicants respectfully request that these rejections be withdrawn.


CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Dated: August 7, 2007

Respectfully submitted,

By 
Randy J. Pritzker
Registration No.: 35,986
WOLF, GREENFIELD & SACKS, P.C.
Federal Reserve Plaza
600 Atlantic Avenue
Boston, Massachusetts 02210-2206
(617) 646-8000